# Forest Sciences

## Prince Rupert Forest Region

*Extension Note # 03*
*February 1995*

## Rainstorm and Flood Damage: Northwest British Columbia 1891-1991

**Research Issue Groups:**

- Forest Biology
- Forest Growth
- Soils
- Wildlife Habitat
- Silviculture
- Timber Harvesting
- Ecosystem Inventory and Classification
- Biodiversity
- Ecosystem Management
- Hydrology
- Geomorphology
- Extension
- Forest Engineering

### Background

Storms, floods, and torrents have caused devastating impacts to property and resulted in the loss of human life in northwest British Columbia. Many events have occurred over the past century: some are recorded in newspapers, journals, technical reports, ship logs, diaries, and company documents; others are lost in the memories of those affected. Storms are critically important to many people working and living within the resource-based communities of northwest British Columbia. However, historical information on events and their impacts is scattered sparsely throughout many different sources. A comparison of events becomes extremely difficult. The old-timer often makes comparisons with past events, but details of the events are often inaccurate or exaggerated.

Usk Flood 1936

### New Publication

A new publication from the Ministry of Forests Research Program provides a catalogue of information on historically important events pertaining to floods, rainstorms, landslides, and snow avalanches. The information contained in the publication is assembled for northwest British Columbia, extending from Bella Coola in the south to Stewart in the north, from the Bulkley Valley in the east to the Queen Charlotte Islands in the west. Most of the information contained in the catalogue details descriptions of storm damage as presented in original accounts.

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The main source of information is newspaper accounts of storm damage and climatological station records. Many other sources were consulted: technical journals, company records, government agency files, ship logs, diaries, and Hudson's Bay Company journals.

**Example Catalogue Entry**

**July 5-7, 1891**

Precipitation: Port Simpson (198.4 mm/3 days), July 5-7, 1891.

Source: The Daily Columbian, July 8 and 13, 1891;
Victoria Daily Colonist, July 14, 1891;
The Metlakahtlan, December , 1891;
Rev. Ebenezer Robson, diary, January 1-December 31, 1891, PABC H D R57.2 Provincial Archives, Victoria, B.C.;
Walbran 1909.

Details: Three days of steady rain, with 12 in. (304.8 mm) in the first 24 hours, caused debris slides along the Inverness Channel. On July 6, the second of two slides hit the North Pacific Cannery. The Indian houses were swept away, killing nine Native Indians. Two debris slides hit the Inverness Cannery. The first one missed the dwelling of the white cannery employees. The second slide wiped out nine houses, including the mess house and the cannery foreman's residence. Approximately 40 Native Indians and the foreman's wife were killed. By July 8, the bodies of 13 Indians were recovered.

### Types of Events

The mountainous terrain of north coastal British Columbia has a dominating influence on weather and subsequent storms and floods. Five types of events, grouped by storm and flood mechanism, occur in northwest British Columbia.

### Snow melt floods

Late spring/early summer snow melt floods occur when cool weather extends into the late spring/early summer months. A sudden rapid warming to hot weather extending over a period of a few weeks leads to a rapid melt of the snowpack, which brings rivers to flood levels. These floods have historically occurred at the end of May to early June, most notably region-wide in 1894, 1898, 1936, and 1948. Smaller floods occurred in 1916, 1942, 1964, and 1972. Rainstorms can also augment snow-melt runoff in localized areas; for example, the 1986 Father's Day storm that caused minor flooding on the Telkwa and Bulkley rivers near Smithers. Torrential rains and a late melting snowpack caused floods and washouts in northern and northwest British Columbia in July 1974. Spring rain combined with rapid snow melt effects have also triggered debris flows at interior locations within the region.

### Fall rainstorms and rain-on-snow events

The stage is set for fall floods during the months of September to late November. Rain from frontal storms of long duration, low intensity falls on a shallow snowpack, and the rain and melting snow together contribute to a flood. The more severe events have been caused when the snowpack extends to lower elevations and the freezing level rises rapidly with the onshore movement of a warm frontal system. The most mentioned flood along the British Columbia north coast occurred across the region in 1978, extending from the Queen Charlotte Islands to the Terrace - Kitimat area. Other similar events occurred in 1961, 1964, 1974, and 1991. The available historic information, however, suggests that the largest fall rainstorm-flood along the British Columbia north coast occurred in 1917. Swanson Bay, located on the inside passage southeast of Prince Rupert, recorded 2,395 mm of rain over a 25-day period (October 28-November 21) and on a single day during the storm received 269 mm of rain (snow condition and freezing level changes for the storm are unknown). These fall rain storms and floods cause extensive debris avalanche and torrent activity throughout coastal areas of the region. The highest peak flow discharges recorded for rivers in the region occur during the fall floods.

### Summer rain storm and floods

High intensity summer rain storms, though rare, do occur in the region. The most extreme event occurred in July 1891. Debris avalanches triggered during the storm hit residences at the North Pacific Cannery and Inverness Cannery located on Inverness Passage south of present-day Port Edward, killing 50 people. Similar localized storms have in recent years caused debris avalanches and torrents on the Queen Charlotte Islands (Alliford Bay, August 2, 1983; Tartu Inlet, September 19, 1985; Louise Island, August, 1991.

### Ice jam floods

Ice jam floods caused by freeze-up or the breakup of ice have caused flooding on the Skeena and Bulkley rivers. These types of floods can occur from November to April. The Skeena River near Terrace had ice jam floods in January 1928 and February 1954. Little damage occurred during the events. In January 1919, ice jammed the Bulkley River east of Telkwa taking out two

spans of the bridge at Hubert. The old Highway 16 bridge across the Bulkley River at Smithers was lost during a spring ice jam flood (April 1966).

Homes at Quick were surrounded by water from the Bulkley River during a freeze-up jam, Christmas 1984. A freeze-up jam also occurred in December 1992, near Smithers.

### Glacial outburst floods

Glacial outburst floods, or "jökulhlaups," are caused by a sudden release of water stored behind an ice dam. The peak discharge caused by the outburst often exceeds, by a large order of magnitude, the expected peak runoff for the watershed. The occurrence is relatively rare, but events in some watersheds are evident by a swath of destruction extending down the river valley below a glacier, for example, Summit Lake near Stewart.

### Snow avalanches

Mountainous terrain and heavy snowfall throughout the region leave many slopes susceptible to snow avalanches. Although avalanches are common in the mountain valleys of the area, most of these are not inhabited. However, the threat does exist along transportation corridors and settlements in remote areas. Climatic conditions such as a heavy snowfall, followed by warm weather and rainfall, can trigger large catastrophic snow avalanches. A catastrophic avalanche west of Terrace on January 22, 1974 wiped out a gas station, motel and restaurant complex, killing seven people. An avalanche on Leduc Glacier near Stewart killed 26 and injured 20 (February 1965). Seven people were killed and five injured near Ocean Falls by a January 1965 avalanche.

### Management Implications

Many events (rainstorms, floods, debris torrents and snow avalanches) over the last century were of a sufficient magnitude to cause extensive destruction, damage to property, and deaths. The frequency of these events clearly shows that they must be planned for. We must not be lulled into a false sense of security, letting complacency govern our actions. If we do, a considerable loss of life and destruction of property and developments could result. Hazard recognition, mapping and evaluation, if used for land use planning and development decisions, would help prevent future tragedies and economic loss.

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## Suggested Reading

**Septer, D. and J.W. Schwab**. 1995. Rainstorm and flood damage:
northwest British Columbia 1891 - 1991. Land Management Handbook No. 31 B.C. Min. For. Research Program Victoria B.C.